

WHAT IS CLAIMED IS:

1. A marine diesel engine system comprising:

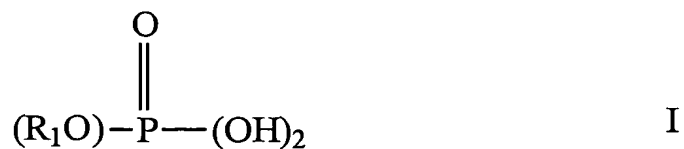
5 a slow-speed cross head marine diesel engine with at least one cylinder;

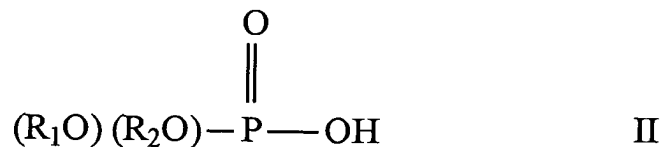
cylinder lubricant components proximate the engine, the components comprising: (i) a primary lubricant and (ii) an additive selected from the group
10 consisting essentially of (i) an alkylamine-alkylphosphate having at least 1.25 equivalents of alkylamine to 1.0 equivalents of alkylphosphate and a nitrogen to phosphorous weight ratio of at least 0.5, (ii) 500 TBN calcium sulfonate, and (iii) mixtures thereof; and

15 means for blending the primary lubricant and additive into a mixture for introduction into the cylinder when engine conditions require the mixture.

2. The system of claim 1 including means for measuring one or more engine parameters and calculating from the measured parameters the
20 engine operating conditions thereby determining when the mixture is required.

3. The system of claim 1 wherein the alkylphosphate is a mixture of mono- and dialkyl phosphates having the formulae I and II





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where R_1 and R_2 are the same or different alkyl groups of from about 4 to about 30 carbon atoms and wherein the alkyl amine is selected from linear and branched mono and dialkyl amines and mixtures thereof having from about 6 to about 50 carbon atoms.

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4. A method for lubricating one or more cylinders of a cross-head marine diesel engine based on the requirement for an enhanced wear and corrosion resistant lubricant comprising:

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measuring one or more engine condition parameters;

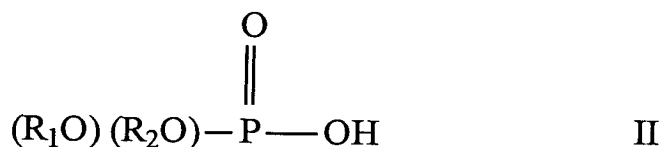
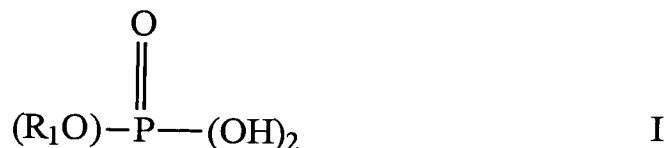
calculating from the measured parameters each cylinder's requirement for an enhanced wear and corrosion resistant lubricant; and (i) when a cylinder does not require an enhanced lubricant, lubricating the engine cylinder with a primary engine lubricant (ii) and when a cylinder requires an enhanced lubricant, mixing the primary lubricant with an effective amount of an additive selected from the group consisting essentially of (i) alkylamine-alkylphosphate additive having at least 1.25 equivalents of alkylamine to 1.0 equivalents of alkylphosphate and a nitrogen to phosphorous weight ratio of at least 0.5, (ii) 500 TBN calcium sulfonate, and (iii) mixtures thereof; thereby forming a mixture; and lubricating the cylinder with the mixture.

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5. The method of claim 4 wherein the alkylphosphate is a mixture of mono- and dialkyl phosphates having the formulae I and II

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where R_1 and R_2 are the same or different alkyl groups of from about 4 to about
10 30 carbon atoms and wherein the alkyl amine is selected from linear and
branched mono and dialkyl amines and mixtures thereof having from about 6 to
about 50 carbon atoms.

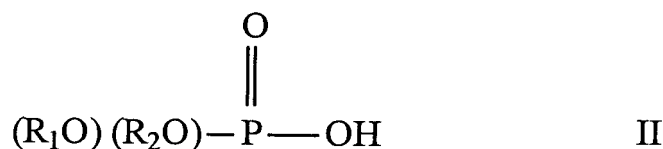
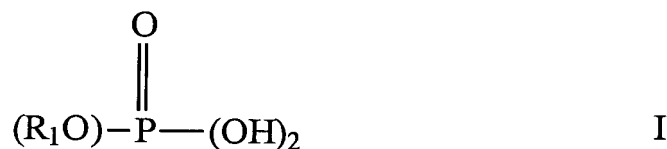
6. A method for lubricating one or more cylinder's of a two stroke
15 cross head marine engine comprising:

lubricating the cylinder with a primary lubricant when combusting a
fuels containing sulfur levels of about 0.5 wt% to 2.0 wt%; and

20 lubricating the cylinder when combusting fuels containing sulfur
levels greater than 2.0 wt% to about 5.0 wt% with a mixture of a primary
lubricant and an additive selected from the group consisting essentially of (i) an
alkylamine-alkylphosphate having at least 1.25 equivalents of alkylamine to 1.0

equivalents of alkylphosphate and a nitrogen to phosphorous weight ratio of at least 0.5, (ii) 500 TBN calcium sulfonate and (iii) mixtures thereof.

7. The method of claim 6 wherein the alkylphosphate is a mixture
5 of mono- and dialkyl phosphates having the formulae I and II



10 where R_1 and R_2 are the same or different alkyl groups of from about 4 to about 30 carbon atoms and wherein the alkyl amine is selected from linear and branched mono and dialkyl amines and mixtures thereof having from about 6 to about 50 carbon atoms.

- 15 8. A method for increasing the TBN of an SAE 50 grade lubricant composition from about 40 TBN to about 100 TBN without substantially affecting the SAE grade, the method comprising adding to the lubricant a sufficient amount of 500 TBN calcium sulfonate.

- 20 9. The method of claim 8 wherein up to approximately 15% wt% of a 500 TBN calcium sulfonate is used based on the total weight of the lubricant.